
Office of Legacy Management (LM)

**Preservation of
Long-Term Temporary Records**

*Digital Conversion
of X-Ray Film*



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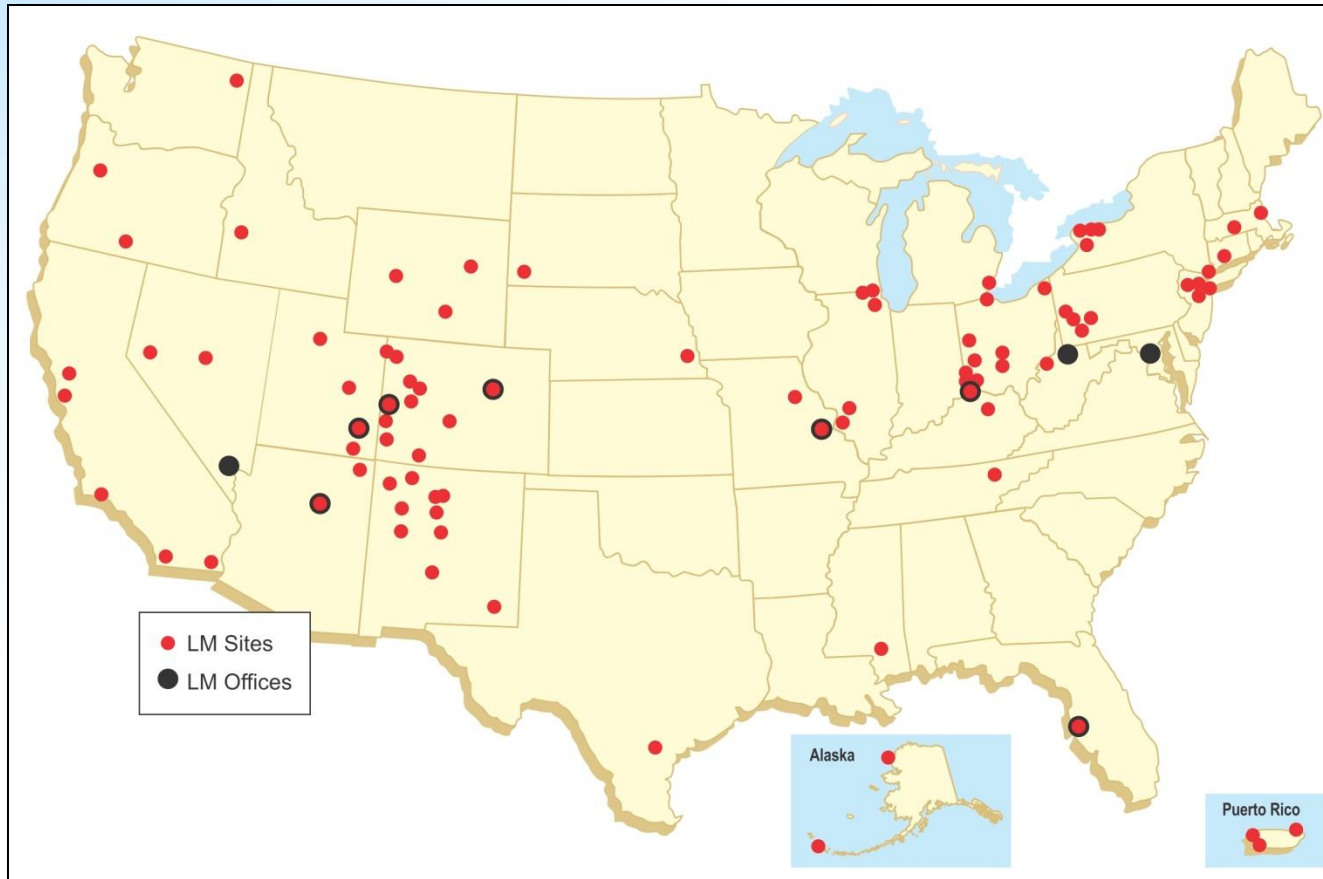


U.S. DEPARTMENT OF
ENERGY

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LM Mission

To fulfill the Department's post-closure responsibilities and ensure the future protection of human health and the environment



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LM Goals



Goal 1 – Protect human health and the environment



Goal 2 – Preserve, protect, and share records and information



Goal 3 – Meet commitments to the contractor work force



Goal 4 – Optimize the use of land and assets



Goal 5 – Sustain management excellence



LM Records Management Responsibilities

- As sites are identified for mission closure, remediated, and transferred into LM's authority, associated records and information are preserved and managed
- Managing records for 90 sites
 - 110,000 cubic feet of records
 - Stored at LM Business Center and Federal Records Centers



LM Business Center, Morgantown, West Virginia



Challenges in Managing Inherited Records Collections

- Limited records descriptions and indexes
- Limited knowledge of records collection contents
- Discovery of additional records after site transition
- Preservation of fragile media



Preserving X-Ray Film

- Medical x-rays have long-term records retention
- Epidemiological records freeze
 - Records must be preserved and cannot be destroyed even if retention period is met
 - Records needed to support medical compensation claims



LM X-Ray Records

- Some x-ray film showing signs of decay known as “vinegar syndrome”
- LM managing over 400,000 x-ray film records
- Most older x-rays were created on a cellulose acetate media base
 - Cellulose acetate, first introduced in 1948, was considered a marked advance over earlier cellulose nitrate film because of lower flammability
 - Poor chemical stability was not recognized at the time, but it has since become a major threat for collections due to spontaneous chemical decay¹

¹James M. Reilly and Jean-Louis Bigourdan, “Effectiveness of Storage Conditions in Controlling the Vinegar Syndrome: Preservation Strategies for Acetate Base Motion-Picture Film Collections” (Image Permanence Institute, Rochester Institute of Technology, Rochester, New York, USA, 2000).



Vinegar Syndrome Effects

- Vinegar syndrome damage can render film unreadable
- Signs of affected film²:
 - Forms “waves” so that film will not lie flat
 - Film base become acidic, brittle, and shrinks
 - Emulsion cracks so that the image appears fragmented and may flake
 - Acetic acid creates a harsh, vinegar odor
- Deterioration may place otherwise stable materials at risk when exposed to off-gassing vapors from nearby degrading film.

²National Archives of Australia, “How do I protect and handle motion picture film?” (Australian Government, Records Management)



Film damaged by vinegar syndrome



Mitigation for Vinegar Syndrome

- Cold storage will slow down deterioration process
- Environmental controls
 - 40° Fahrenheit
 - 30 percent relative humidity
- Decaying film should be segregated
 - Vinegar syndrome affects “healthy” film



Cold Storage Trailer –
Grand Junction, Colorado



Cold Storage Vault –
Morgantown, West Virginia

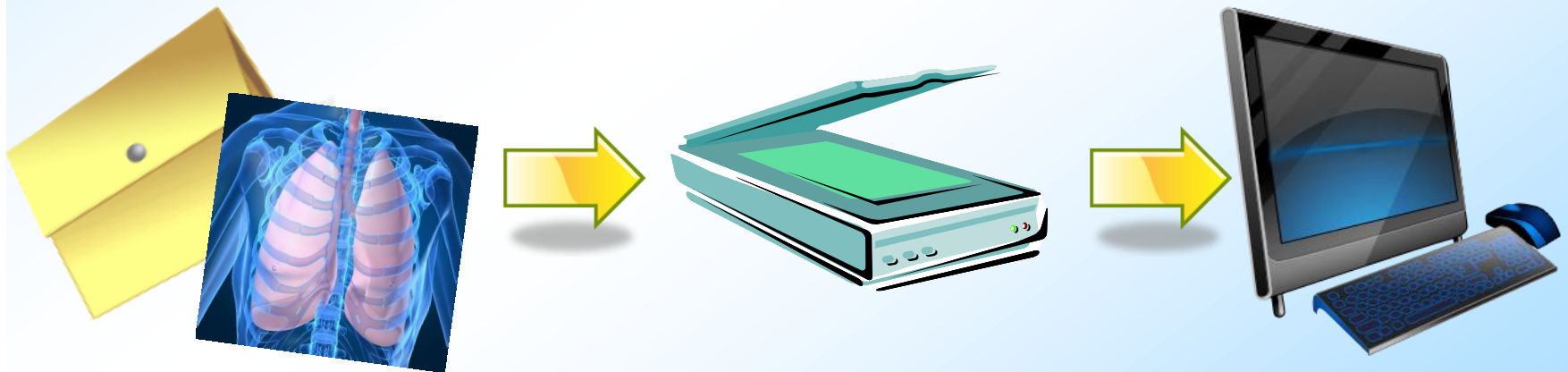


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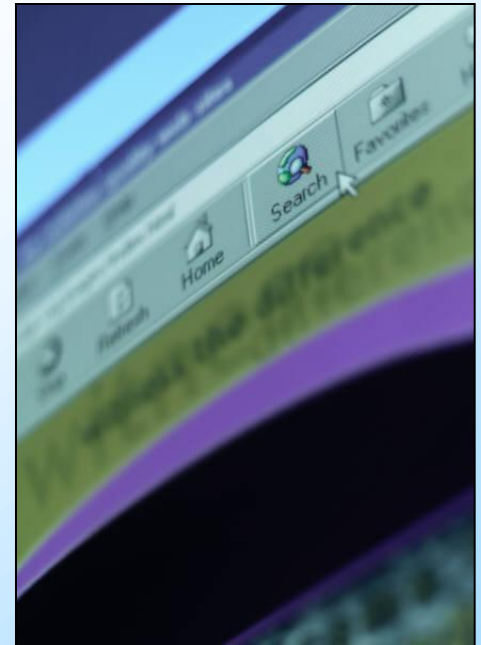
LM Digitizing Project

- Conversion of x-ray film to digital images
- Digital Imaging and Communications in Medicine (DICOM) format
 - Global information technology standard
 - Legally accepted format



Managing Electronic Images

- Stored and retrieved through LM Electronic Recordkeeping System
- Records Disposition
 - DOE Administrative Schedule 20: Electronic Records
 - ADM 20.3 – Electronic Records that Replace Temporary Hard Copy Records (GRS 20, Item 3)
 - Item a, Scanned Images – Delete after the expiration of the retention period authorized for the hard copy records
 - ADM 20.2 – Input/Source Records (GRS 20, Item 2)
 - Item 2a(4) – Destroy hard copy documents after information has been converted to an electronic medium and verified



Deteriorated Film



Electronic DICOM Image

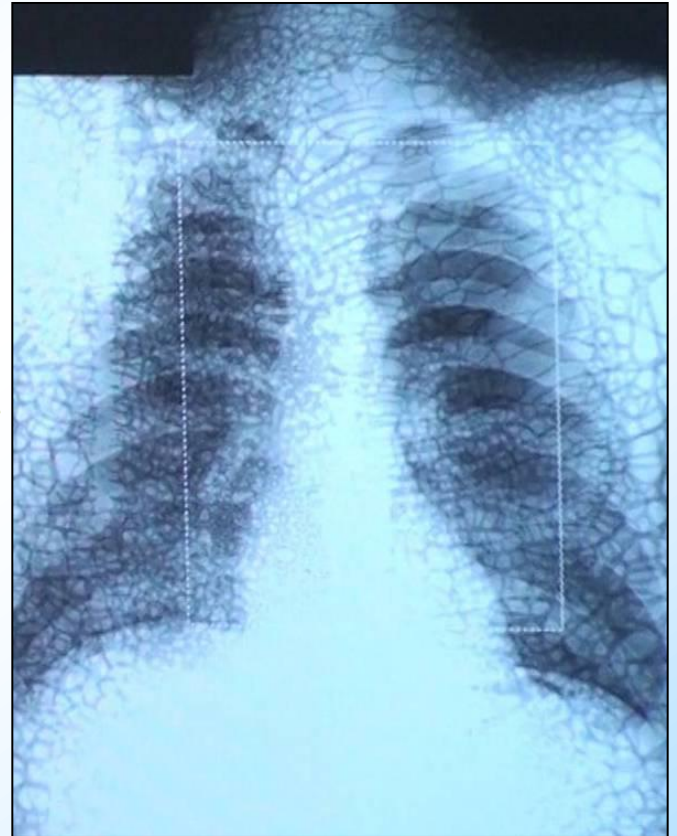


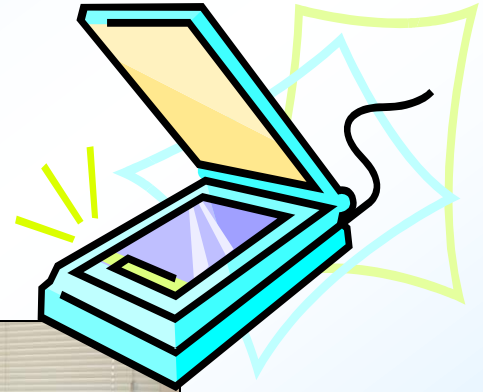
Image is captured “as is” for long-term preservation



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LM X-Ray Digitizing Process Video



Questions?

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